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Catalogue of the Fishes of Lower California in the Smithsonian Institution,  
collected by Mr. J. Xantus.

BY THEODORE GILL.

PART I.

Mr. John Xantus, when stationed at Cape St. Lucas, Lower California, as a tidal observer for the coast survey, brought together a very large collection of objects of natural history, among which is a most excellent series of the fishes of the coast. The collections were formed under the auspices and direction of the Smithsonian Institution, to which the species were sent from time to time and deposited in its museum. By permission of the Secretary of the Institution, I propose to give a preliminary synopsis of the species discovered on that coast, embracing descriptions of the numerous new species. At a future time I trust that I shall be enabled to publish a more complete monograph accompanied by figures of the various species. The following descriptions are, however, pertinent, and will enable naturalists, in most cases, to readily identify the species. The Pomacentroids are the only ones, I believe, concerning which there can be doubt, but I think that I have succeeded in giving them, also, their distinctive characters after an examination of many species.

In the final part of this catalogue, the peculiarities of the Fauna of Lower California will be discussed, and its relations to that of other regions. Some species are common to even the temperate seas of South America and the West Indies, but a very large proportion of those discovered are new.

Family LABROIDÆ (Cuv.) Bleeker.

Subfamily LABRINÆ (Bon.) Gill.

The representatives of the Labrinæ found in the California waters belong to the "group" of Julidina, characterized by Dr. Günther in his excellent Synopsis of the Labroid Genera. The course of the lateral line appears to be more important than the number of spines, and, consequently, we may associate those Labroids with an interrupted or suddenly deflected line (except Gomphosinæ) in one subfamily, (Xirichthyinæ) and provisionally refer the rest of the Julidina, the Hypsigenina and Labrina of Dr. Günther to one subfamily, (Labrinæ) as I know of no important characters coincident with the number of dorsal spines.

Only one species of the Labrinæ inhabiting the California coast has been hitherto described. It is the *Semicossyphus pulcher* Gthr. (*Labrus pulcher* Ayres.) Two new species are now described, both of which belong to the genus *Harpe* (Lac.) or *Cossyphus* Cuv., (not Fabricius.)

Genus HARPE Lac.

This may be retained as by Lacépède for those species whose median dorsal and anal rays become much extended in the adult. The *Cossyphus axillaris* Cuv. et Val. &c., may be then referred to a new genus (*Lepidaplois*) distinguished by the nearly uniform anal.

HARPE DIPLOTÆNIA Gill.

The greatest height, inclusive of the scaly sheath of the dorsal fin, equals a fourth of the length from the snout to the end of the median caudal rays. The head scarcely exceeds the height; its profile is not or very little gibbous in the adult. The preoperculum is entire or scarcely crenulated; its posterior margin is vertical, and its angle obliquely rounded. The eye is subcircular, contained about six times in the head's length, and distant from the snout about two diameters and-a-half. The height of the preorbital bone equals half the length of the snout. The mouth is moderate, the supramaxillary bone ending

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nearly under the posterior nostril. The four canine front teeth of the upper jaw are conoid, and of nearly equal size, the two median curved slightly forwards, and the external downwards and sideways; *the four of the lower jaw have nearly the same inclination forwards*; the two median are about half as long as the external, contiguous to them, and themselves inclining towards each other. Behind the canine teeth are small granular ones.

The acuminate dorsal and anal fins increase in length with the age of the fish, and in the adult the former extends nearly to, and the latter beyond the median caudal rays, while the external rays of the caudal are twice as long as the median. The ventrals of the adult are also elongated, and extend to the third anal spine. The pectorals are as long as the head in front of the operculum.

The scales are moderately large, there being thirty-three along the lateral line, five rows above, at the origin of the dorsal fin, and twelve rows beneath. On the caudal peduncles there are four rows above, and five beneath.

D. XII. 11. A. III. 13.

The color is brownish yellow, reticulated on the trunk with a dark brownish hue, which margins each scale. A dark band commences behind the snout, obliquely tends towards the eye, and behind is divided into two, the upper of which runs along the oculo-scapular groove, is continued high on the side, and nearly joins the corresponding one on the back of the caudal peduncle; the lower one crosses the operculum at its angle, and on the caudal peduncle runs along the lateral line, but ceases before the end of the latter, and alternates with two spots behind the base of the caudal fin. A band less distinct runs on the head from the angle of the mouth, and passes close above the angle of the preoperculum. The pectoral fins are immaculate and yellowish; the spinous dorsal has its postspinal tips orange; the posterior parts of the dorsal and anal as well as of the caudal are yellowish, while the rest is darker. The first ray of the ventrals is orange.

Two specimens of this species were sent to the Smithsonian Institution by Mr. Xantus; one is in spirits and is nearly nine inches long. The dorsal extend back to the end of the caudal scales; the anal to the base of the lower caudal rays; the external caudal rays are scarcely produced; the ventrals do not extend to the anus. The other is about sixteen inches long; the dorsal ends rather behind the caudal scales, while the anal is much produced, and extends as far back as the posterior caudal margin; the external caudal rays of the naked part of the caudal are nearly twice as long as the others.

#### HARPE PECTORALLIS Gill.

The greatest height is little more than a third of the length. The head is contained about three times and a third in the same length, and in the young is symmetrical and conical, the profile being nearly straight, but in the adult the forehead is very gibbous above the eyes. The preoperculum is either entire or very slightly crenulated, vertical behind, and with its angle obliquely rounded and curved forwards. The eye is subcircular, and its diameter a little less than a sixth of the head's length; it is distant two and a-half times its diameter from the snout; the height of the preorbital bone equals half the length of the snout. The mouth is moderate, the supramaxillary bone ending nearly under the posterior nostril. The four large teeth of the upper jaw are nearly equal in size; the median are approximated and curved outwards, and are separated by a diastema from the external, each of which is curved downwards and outwards. Of the front teeth of the lower jaw, the two median are *very small, nearly vertical, and separated by a diastema from the external*, which are as large as those of the upper and directed forwards. Behind the large teeth is a band of granular ones.

The summits or angles of all the fins, except the pectoral, become elongated with advancing age, so that, finally, the dorsal extends backwards nearly to, 1862.]

and the anal beyond the median caudal rays; the external caudal rays increase, and become twice as long as the median, and the ventral extend backwards nearly as far as the base of the anal. The pectorals are constant in their proportion, and equal the length of the head exclusive of the operculum.

5 4  
D. XII. 11. A. III. 13. Scales 32—33 — —.

12 5

When dried, the color is brownish-yellow, and reticulated, the margin of each scale being darker. The terminal halves of the posterior dorsal and anal fins, as well as of the shorter caudal rays, are orange; the largest caudal rays, and the anterior borders of the dorsal and anal are reddish; the rest of these fins, as well as the ventrals, are darker. The pectorals are orange, with its tip marked by a large dark spot.

"When alive, a yellow patch of the size of a half dollar is just behind the side (pectoral) fins. Head, tail, and all the fins bright red, with the tips black and yellow. Whole body bright blue."

It is allied to *Harpe rufus*—*Cossyphus rufus* Gthr., or *Cossyphus bodianus* Cuv.

There are three specimens in the collection:—

1st. One a foot long from the snout to the concavity of the caudal, beyond which the external rays project about an inch; the dorsal extends little beyond the scaly sheath of the caudal, and the anal to the middle of the external rays; the ventrals reach the anal. The forehead is not gibbous.

2d. One sixteen inches long to the concavity of the caudal fin, of which the exposed parts of the external rays are twice as long as those of the others; the dorsal extends backward nearly to, and the anal beyond the caudal margin; the ventrals pass the middle of the base of the anal. The hump of the forehead exceeds by a half the eye's diameter.

3d. An old specimen, two feet long, with the caudal lobes rather more produced, but the dorsal, anal and ventrals rather less than in the second. The hump on the forehead is very elevated, and twice the diameter of the eye.

#### Subfamily XIRICHTHYINAE Gill.

##### Group JULIDES.

##### Genus JULIS (Cuv.) Günther.\*

##### JULIS LUCASANUS Gill.

The height at its highest part equals a fifth (19-20) of the total length. The head is oblong, moderately decurved in front of the eyes, and forms nearly a quarter of the total length; its height above the preopercular margin nearly equals two-thirds (15-24) of its own length, and over the pupil, a half (12-24). The length of the snout equals a third and is about twice as great as the height of the preorbital. The diameter of the eye equals a quarter of the head's length. The interorbital area is nearly arched transversely, and its shortest width exceeds the diameter of the orbit.

The dorsal fin commences nearly over the bases of the ventral fins, and is

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\* The *Julis modestus* of Girard (*Halichares californicus* Gthr) belongs to this genus. The description by Girard of this species, as well as most others, is very defective, the characters being chiefly vague or generic. The *Julis modestus* has an oblong, acutely

2 3

conic head; D. VIII. 14; scales 26 — —. Lin. lat. ant. 20; the tubes of the lateral lines simple and straight.

I have not seen the *Julis semicinctus* of Ayres, but on account of its height and the presence of nine dorsal spines, am inclined to refer it to *Halichares*, or rather *Chærojulis*, the former name being preoccupied for a genus of Seals. Ayres, like Girard, may have mistaken the number of spines, but it may be assumed that he is correct.

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nearly uniform at its respective parts, the soft being rather higher than the spinous.

The anal fin commences at or close before the middle of the length.

The caudal, when expanded, is truncated, and forms a sixth ( $\frac{1}{6}$ ) of the total length.

The pectorals have very oblique bases, and equal in length the height of the body, ( $\frac{1}{19}$ ). The ventrals are inserted somewhat before the lower axilla of the pectoral, from which each is separated by a space equal to the base of the pectoral. The length equals an eleventh of the total.

The tubules of the lateral line are generally more or less trifid (rarely quadrifid) on each scale.

1

D. VIII. 13. A. III. 10 —. Scales 25.

1

The color of the upper half, except a lighter band below the dorsal fin, is dark purplish, and abruptly separated from the light brownish or rose of the lower half. The soft portion of the dorsal is margined with whitish; the rest, as well as almost the whole of the spinous portion, is dark. The basal half of the anal is light brownish, and the margined half whitish. The caudal has above and below a narrow marginal line of whitish and a submarginal purplish band; the rest is yellowish. The upper axilla of the pectorals has a dark purple dot.

Many specimens of this species, the largest of which is three inches long, were obtained by Mr. Xantus.

#### Group *XIRICHTHYÆ*.

This group, embracing the *Xirichthyinæ* with an interrupted line, is represented by a number of genera which may be briefly characterized as follows:

##### I. Dorsal spines 9 (10).

###### A. First two spines forming a distinct fin.

Cheeks with small scales.....Novacula.

Cheeks naked (*Xirichthys pavo* C. V.).....Iniistius.

###### B. Dorsal fin continuous.

###### C. Cheeks naked.

###### a. Scales large.

Ventrals thoracic.....*Xirichthys*.

Ventrals subjugular (*Xir. taniurus* C. V.).....*Malacocentrus*.

β. Scales small (*Xir. microlepidotus* C. V.).....*Cymolutes Gthr.*

###### CC. Cheeks with large scales.

###### a. Supramaxillars normal.

###### 1. Head and eyes moderate.

Dorsal and anal acutely angulated near end.....*Cheilinus*.

Dorsal and anal angulated at end (*Cheil. arena-*  
*tus* C. V.).....*Oxycheilinus*.

###### 2. Head very large; eyes small (*Cheil. undulatus* C. V.).....*Crassilabrus*.

β. Supramaxillars prolonged behind by a membran-  
ous extension.....*Epibulus*.

##### II. Dorsal spines 11.....*Cirrhilabrus*.

There is another genus (*Doratonotus* Gthr.) which is said to have the spinous portion of the dorsal strongly depressed in the middle. It has as yet been only indicated. The *Xirichthys altipinnis* of Rüppell has a similar depression of the dorsal.

#### *XIRICHTHYS MUNDICEPS* Gill.

The greatest height close behind the ventral fins nearly equals a quarter (23-100) of the total length; the elevation above the axis is nearly uniform at the spinous dorsal, but under the soft is slowly decurved to the caudal pe-  
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duncle; the preanal region is nearly horizontal, but behind is nearly rectilinear and slowly trends upwards to the caudal. The height of the caudal peduncle equals a tenth ( $\cdot 10$ ) of the total length.

The head is scarcely longer than high, and curved from the dorsal to the eyes; it is laterally rhomboid, the profile in front of the eyes descending downwards in a nearly straight and oblique line at an angle of about  $43^\circ$  to the longitudinal axis of the body, and nearly parallel with the preoperculum. The length from the snout to the end of the subopercular membrane constitutes a quarter of the total, and is a fifth greater than the height at the vertical margin of the preoperculum. The snout (from the orbit to the symphysis of the intermaxillaries) is more than a third ( $\cdot 27$ ) of the head's length, and nearly twice ( $\cdot 5$ ) as great as the oblique height of the preorbital. The eye is moderate, the diameter being contained between five and six ( $4\frac{1}{2}$ - $25$ ) times in the length of the head; the distance from the profile equals two-thirds of that diameter; that from the lower margin of the preoperculum nearly ( $\cdot 8$ - $\cdot 9$ ) equals the distance from the snout.

The preoperculum is rounded at its angle, vertical behind and horizontal below. The operculum equals the depth of the preorbital, and the suboperculum extends nearly an eye's diameter, the distance between the end of the subopercular membrane and the preoperculum equalling the height of the operculum behind the latter.

The dorsal fin commences nearly over the middle of the operculum, or more than a fifth ( $\cdot 21$ ) of the total from the snout; the spinous portion occupies a quarter ( $\cdot 25$ ), and the articulate much more than a quarter ( $\cdot 29$ ) of the total length. The spinous portion is nearly uniform, the first spine nearly equaling the diameter of the orbit ( $\cdot 4$ ) and the second and following exceeding it, ( $\cdot 5$ — $\cdot 6$ ): the whole fin almost imperceptibly increases towards the middle of the soft part. The articulated rays are not branched, the last only being divided at its base.

The anal fin commences behind the second fifth of the length and nearly under the ninth dorsal spine; its base equals a third ( $\cdot 33$ ) of the total length; its height is nearly uniform.

The caudal is scarcely convex, and forms a sixth ( $\cdot 17\frac{1}{2}$ ) of the length.

The pectoral fins extend nearly to the vertical of the anus, and equal in length a sixth ( $\cdot 16$ ) of the total length.

The ventrals are inserted under the lower axilla of the pectoral, and the length equals an eleventh ( $\cdot 9$ ) of the total; they are acutely pointed, the first ray being considerably longest.

The scales are in twenty-four oblique transverse rows; at the region of greatest height in ten longitudinal ones, ( $\frac{1}{9}$ ) and on the caudal peduncle in seven ( $\frac{3}{3}$ ) rows. The lateral line is composed of simple tubules; its elevated part runs through nineteen and its caudal portion through five scales.

D. IX. 11 — A. III. 10 — Scales 24 — — Lat. line 19—5.

The color is uniform flesh-colored tinged with brown.

|                                    |     |
|------------------------------------|-----|
| Total length, $3\frac{1}{2}$ ..... | 100 |
| Body—Height over ventrals.....     | 23  |
| "    of tail.....                  | 10  |
| Width.....                         | 8   |
| Head—Length.....                   | 25  |
| Width.....                         | 9   |
| Height at preoperculum.....        | 20  |
| Height of preorbital.....          | 5   |
| Length of operculum.....           | 10  |

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|                                 |     |
|---------------------------------|-----|
| Orbit—Diameter.....             | 4½  |
| Distance from snout.....        | 9   |
| “ “ profile.....                | 3   |
| “ above preoperculum.....       | 8   |
| Dorsal—Distance from snout..... | 21  |
| Length of spinous part.....     | 25  |
| soft part.....                  | 29  |
| Anal—Distance from snout.....   | 42  |
| Length.....                     | 33  |
| Caudal—Length.....              | 17½ |
| Pectoral—Length.....            | 16  |
| Ventral—Length.....             | 9   |

Numerous specimens were obtained by Mr. Xantus, but most of them are very small; the largest is less than four inches long.

#### Genus INIISTIUS Gill.

##### INIISTIUS MUNDICORPUS Gill.

This species has the same form of the head and body as *Iniistius pavo*. The greatest height equals three-tenths (.30) of the length and that of the caudal peduncle a ninth (.11) of the same. The head forms less than three-tenths (.28) of the length, and is equal to the height over the preoperculum. The eye is small, its diameter entering seven times (.4) in the head's length; it is distant a diameter from the profile. The height of the preorbital equals a tenth (.10) of the total length. The front teeth of the upper and lower jaws are nearly equal, and those of the latter are received between those of the former. The anterior occipital spine equals the length of the pectoral and nearly a fifth (.19) of the total. The ventrals exceed a seventh (.15) of the length and are inserted entirely under the upper angle of the base of the pectoral. The caudal scarcely forms a seventh (.14) of the length.

D. II. VII. 22, 19 — <sup>1</sup>/<sub>1</sub>. A. 3, 11 — <sup>1</sup>/<sub>1</sub>. C. 2, 5, 5, 2. P. 2, 10. V. I. 5. Scales

24 — <sup>2</sup>/<sub>10</sub>. 25 inclusive of large one on caudal, <sup>3</sup>/<sub>10</sub> behind occipital fin; at anus— <sup>2</sup>/<sub>8</sub>.

The body is yellowish or brownish and entirely immaculate. The dorsal alone has several oblique bars between its rays.

One specimen, nearly ten inches long, was obtained by Mr. Xantus at Cape St. Lucas, and is now in the Museum of the Smithsonian Institution. The right front tooth of the lower jaw is deflected forwards horizontally.

#### Family POMACENTROIDÆ.

##### Genus EUSCHISTODUS Gill.\*

This name is appropriated to a group of Pomacentroids having nearly the same physiognomy as *Hypsypops*, but the teeth, instead of being entire, are very

\* A second species of this genus is an inhabitant of Panama, where it was discovered by Capt. J. M. Dow.

The forehead is transversely convex but not arched, the profile in front less steep, the preorbital higher behind, and the caudal peduncle shorter than in *Euschistodus declivifrons*. D. XIII. 12. A. II. 10.

Scales 26 — <sup>4</sup>/<sub>10</sub> — <sup>3</sup>/<sub>3</sub>. L. I. 21.

The color is uniformly chocolate or purplish brown; the bases of the pectorals with falciform black line pointed below.

The species may be named *Euschistodus concolor*.

deeply and acutely notched. The genus *Glyphidodon*, whose teeth are emarginated, have also a short conic head and low (or narrow) preorbital bones.

*EUSCHISTODUS DECLIVIFRONS* Gill.

The region of greatest height is at the sixth dorsal spine; the height there, exclusive of the dorsal sheath,  $\cdot 45\frac{1}{2}$  of the total length; behind the vertical fins the height equals  $\cdot 18$ , and at the lowest portion of the caudal peduncle  $\cdot 15$  of the length.

The outline from the dorsal fin to the nape is convex and very oblique, then rectilinear, and at an angle of  $50^\circ$  to the axis as far as the interorbital region, which is transversely convex; in front the profile is also nearly rectilinear and at an angle of about  $73^\circ$ ; the snout, or rather jaw, is convex or curved inwards. The length of the head forms a quarter of the length, inclusive of the median caudal rays, and equals the height at the vertical of the pupil, but is a sixth less than that at the vertical of the preoperculum. The nape is above the hinder margin of the orbit. The length of the snout exceeds a third ( $\cdot 25$ ) of the head's, and is twice as great as the greatest depth of the preorbital bone and nearly three times ( $9-3\frac{1}{2}$ ) as great as the depth at the angle of the mouth. The preoperculum is entirely vertical behind, horizontal below and obtusely angulated. The operculum forms about a third of the head's length ( $\cdot 8\frac{1}{2}$ ); the operculum and suboperculum together are two and a third times ( $20-8\frac{1}{2}$ ) higher than the length of the operculum. The eye is contained nearly three times ( $\cdot 25$ ) in the length of the head, and the interorbital area is transversely arched and exceeds the eye's diameter.

The mouth is small and its periphery semioval; the lower jaw is considerably shorter than the upper. The supramaxillary bone ends under the anterior margin of the orbit. The lower lip has a free margin, but it is partially attached at the symphysis.

The dorsal fin commences at the vertical from the upper axilla of the pectoral fin; its spinous portion nearly equals two-fifths ( $\cdot 39$ ) and its soft a seventh ( $\cdot 14$ ) of the total length; the spines progressively increase in a curved line towards the fifth, the first spine equalling half the length of the ventral spine ( $\cdot 5\frac{1}{2}$ ); the fifth, from its base, much exceeds ( $\cdot 13$ ), and on its exposed part nearly equals ( $\cdot 10$ ) twice its length; thence they diminish towards the last, which equals the length of the exposed part of the fifth. The soft part at its middle equals the height immediately behind the fin ( $\cdot 18$ ) and is much more than twice as great as the length of the last ray ( $\cdot 7$ ).

The anal fin begins under the penultimate spine, and its soft part is similar to and opposite the corresponding part of the dorsal. The length of the first spine nearly equals that of the first dorsal one ( $\cdot 5$ ), and the second is twice as long ( $\cdot 11$ ).

The caudal fin is emarginated and its lobes rounded; its median rays form  $\cdot 18$  of the total length and are a quarter less than the longest ( $\cdot 25$ ). The pectorals are rounded at the angles and equal in length  $\cdot 22$  of the total. The ventral fins are inserted a little behind the bases of the pectorals. The spine equals the second anal ( $\cdot 11$ ) and is half as long as the first and longest ray ( $= \cdot 22$ ) and equal to the internal ( $\cdot 11$ ).

The scales are arranged at the region of greatest height in fifteen rows ( $\frac{4}{16}$ ) and on the caudal peduncle in seven ( $\frac{3}{3}$ ). There are twenty-six obliquely transverse rows, and twenty-one are perforated for the upper part of the lateral line. The scales of the cheeks are in three rows.

The formula for the fins and scales are as follows:

D. XIII. 12. A. II. 12. C. 5. I. 7. 6. I. 4. P. I. 1. 17. V. I. 5. Scales  

$$25-26 \frac{4}{10} - \frac{3}{3} - \text{L. l. sup. } 20-21.$$

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The color is greenish, tinged with brassy and with lighter areas in the centres of the scales on the sides, which form faint, uninterrupted lines. There are six transverse dorsal bands; the first almost obsolete before the dorsal fin; the second under the third to fifth spine; the third under sixth to eighth; the fourth under the tenth to twelfth; the fifth under the anterior half of the soft portion, and the sixth behind the fin.

|  |                      |
|--|----------------------|
| Length from snout to end of median caudal rays ( $3\frac{1}{2}$ )..... | 100                  |
| Body—Greatest height.....  | 43, 45 $\frac{1}{2}$ |
| Height behind vertical fins.....                                       | 18                   |
| " of caudal peduncle.....  | 15                   |
| Greatest thickness.....  | 17                   |
| Head—Length laterally.....   | 25                   |
| Height at preopercular margin.....                                     | 30                   |
| " at pupil.....  | 25                   |
| " of preorbital at end of jaw.....                                     | 3 $\frac{1}{2}$      |
| " " at highest part.....   | 4 $\frac{1}{2}$      |
| Length of snout.....   | 9                    |
| Length of operculum.....   | 8 $\frac{1}{2}$      |
| Height of operculum and suboperculum.....                              | 20                   |
| Width of interorbital area.....  | 9 $\frac{1}{2}$      |
| Eye—Diameter.....  | 9                    |
| Dorsal—Origin from snout.....  | 27 $\frac{1}{2}$     |
| Length of base.....  | 39—14                |
| Height at first spine.....   | 5 $\frac{1}{2}$      |
| " " fifth spine.....   | (10)—13              |
| " " last spine.....  | 8, 10                |
| " " longest ray.....   | 18                   |
| " " last ray.....  | 7                    |
| Anal—Origin from snout.....  | 57                   |
| Length of base.....  | 19                   |
| Height at first spine.....   | 5                    |
| " " second spine.....  | 11                   |
| " " longest ray.....   | 18                   |
| " " last ray.....  | 7 $\frac{1}{2}$      |
| Caudal—Length of median rays.....                                      | 18                   |
| " " longest ray.....   | 25                   |
| Pectoral—Length.....   | 22                   |
| Ventral—Length of spine.....   | 11                   |
| " " first ray.....   | 22                   |

Seven specimens of this species, varying between nearly two and four inches were obtained by Mr. Xantus.

#### Genus HYPSTYPOPS Gill.

This genus, framed for *Glyphidodonte*, with elevated preorbital bones and entire teeth, is rather allied to *Pomacentrus* than to *Glyphidodon*, the technical character bringing its species in the latter genus, being of less real value than the dentition or development of the suborbital bones.

#### HYPSTYPOPS DORSALIS Gill.

The height much exceeds a third ( $\cdot 37$ ) of the extreme length. The head is rather depressed in front of the nape and very steep in front of the eyes; it forms nearly a quarter ( $\cdot 23$ ) of the total length; its height at the vertical of the preoperculum much exceeds the length ( $\cdot 28$ ), and that at the pupil is less ( $\cdot 21$ ). The length of the snout equals two-fifths of the latter height ( $\cdot 8\frac{1}{2}$ ), is about a quarter more than the height of the preorbital bone ( $\cdot 6$ ), which itself is not much less than the diameter of the eye ( $\cdot 7$ ). The preoperculum is perfectly entire, and the teeth of the jaws truncated.

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The dorsal fin commences above the first scale of the lateral line; its greatest height equals or exceeds a quarter of the length ( $\cdot 26$ ). The caudal has acute lobes, forming more than a quarter ( $\cdot 27$ ) of the length, while the median rays scarcely equal a sixth ( $\cdot 16$ ) of the same. The pectorals and ventrals are nearly equally long and exceed a quarter ( $\cdot 21$ — $\cdot 22$ ) of the length; the latter are inserted immediately behind the former. The dorsal and anal are densely scaly.

3      2  
D. XII. 13.   A. II. 11.   Scales 26— —.   Lat. line 21.  
10    3

The color of the entire fish is a deep purplish brown, relieved on the back by two blue spots on each side, as in *Pomacentrus quadrigutta*, (under the fourth spine and under the third or fourth ray,) close behind the dorsal by a transverse linear spot, and on or just above the first scale of the lateral line by another spot. A blue line extends from the snout to the front of the orbit, and a spot exists above before the middle of the orbit. Another blue line crosses the preorbital and passes under the eye. There are also a few other blue dots scattered on the head.

A single specimen of this species, four inches long, was sent by Mr. Xantus to the Smithsonian Institution.

#### Genus POMACENTRUS Lac.

##### POMACENTRUS RECTIFRÆNUM Gill.

The height equals a third ( $\cdot 34$ ) of the total length, inclusive of the entire caudal. The head is regularly decurved from the nape and forms nearly a quarter ( $\cdot 23$ ) of the total length; its height at the preopercular margin exceeds the length ( $\cdot 24$ ) and is rarely a quarter greater than that of the pupil ( $\cdot 19$ ). The length of the snout exceeds a third ( $\cdot 8$ ) of the head's, is greater than the diameter of the eye ( $\cdot 7$ ), which itself is more than twice as great as the height of the entire preorbital ( $\cdot 3$ ) at the angle of the mouth. The preoperculum is finely dented and vertical behind. The teeth are entire.

The dorsal commences above the upper axilla of the pectoral; the greatest height exceeds a fifth ( $\cdot 21$ ) of the total length, and equals the length of the pectoral ( $\cdot 21$ ). The ventrals are inserted behind the pectorals, and equal a quarter of the length. The caudal forms about a quarter of the extreme length, and the inner rays exceed a sixth ( $\cdot 16$ ) of the same.

3      2  
D. XII. 16.   A. II. 15.   Scales 25— —.   Lat. line 21.  
10    3

The color is a deep chestnut, dotted with light blue on each scale on the back and tail, and on the sides with a faint crescentiform line, parallel with the border of each scale. The head has two blue lines diverging from the snout and passing over the eyes to each side of the dorsal; there is an oblique one on the preorbital and also a suborbital line, as well as one below the suborbital chain. Another proceeds backwards from the upper angle of the orbit. A black spot, bordered by blue, is more or less developed behind the dorsal. The dorsal, anal and pectoral are very dark, and the first two dotted with blue.

There are six specimens in the collection of the Smithsonian Institution. The pattern is similar, but not equally vivid in all. There is no indication of a dorsal ocellus.

The following two species were at first supposed to be varieties of one species of *Pomacentrus*, but, as there are no gradations, and as they differ slightly in pattern of coloration as well as the presence of a dorsal ocellus, it is improbable that such is the case.

##### POMACENTRUS FLAVILATUS Gill.

This species differs from the preceding by the presence of a very distinct  
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ocellus on the anterior half of the soft part of the dorsal fin, which also advances downwards as far as the lateral line. The color of the body, below the lateral line, is yellowish brown, with an indistinct dot on each scale; the caudal, pectoral, ventral and anal fins as well as the dorsal fin behind are also yellowish, the external ventral ray and margin of the anal before being darker.

One specimen, about three inches long, was discovered at Cape St. Lucas by Mr. Xantus and sent to the Smithsonian Institution.

*POMACENTRUS BAIRDII* Gill.

This species has the hinder and lower part of its length colored like the preceding, but there is no trace of an ocellus, and the base of the soft part of the dorsal is blue. The ventral fins are also very light. The blue lines from the snout end over the pupils; a transverse line, a third of the interorbital area, exists on that area, and behind it are two short parallel longitudinal lines. There are three blue spots on the suborbital chain and one behind the angle of the mouth. The scales below are not dotted with blue in the middle.

Two specimens, rather less than an inch long, are in the collection of the Smithsonian Institution. The preopercular serrature is almost obsolete.

*POMACENTRUS QUADRIGUTTA* Gill.

The present species differs from *P. rectifrenum* by the greater portion of each scale being blue; the presence of two distant blue spots on the back, one below the end of the dorsal fin, and another at the end of the base of the anal; the color of the head above more like that of *P. Bairdii*. The ventrals are dark as in *P. rectifrenum*, edged, like the anal, with blue.

Many specimens, less than an inch long, were obtained and sent by Mr. Xantus to the Smithsonian Institution. The preopercular serrature is very faint.

Genus *CHROMIS* Cuv.

*Furcaria* was established by M. Poey for two species of Pomacentroids found along the Cuban coast, which were supposed to be distinguished from all others by seven branchiostegal rays and the unequal teeth. M. Poey has kindly sent to the Smithsonian Institution two specimens of the type of his genus, the *Furcaria puncta*, and, after a careful examination but without dissection, I have been unable to count a number so unprecedented and remarkable for a Pomacentroid, and have only discovered five. The name might, however, be retained for the group which differs from the typical species of *Chromis* or *Heliases* by the presence of only twelve dorsal spines.\*

*CHROMIS (FURCARIA) ATRILOBATA* Gill.

The form is probably nearly similar to that of *Furcaria puncta*, but the only specimen sent to the Smithsonian Institution by Mr. Xantus is much injured and shrivelled up, although preserved in alcohol. The greatest height is esti-

\* Another type of the Pomacentroids characterized by a band of conical teeth in each jaw is *Dascyllus* Cuv. (*Tetradrachmum* Cantor). An elegant undescribed species is found at the Sandwich Islands, from which specimens were sent to the Smithsonian Institution by Mr. W. H. Pease. It may be called *Dascyllus albisella*; it has the form of *Dascyllus marginatus* Ehr.; its height exceeds half the entire length. The head forms nearly a quarter of the same. Its forehead before the eye is vertical. The dorsal spine regularly decreases from the second to the last, the second equalling the length of the head and about twice as long as the last. The soft parts of the dorsal and anal are arched.

D. XII. 16. A. II. 15.

5 2

Scales 27—, —. Lat. line 18—19.

12 3

The color is dark grayish, with a transverse white band descending half way down from the middle of the back below the dorsal fin, between its fifth and tenth spines. All the fins, except the pectorals, are very dark.

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mated to have been about three-tenths of the extreme length, *inclusive of the caudal lobes*; that at the origin of the anal fin equals a quarter of the length. The height behind the dorsal and anal exceeds an eighth ( $\cdot 13$ ) of the total length, as well as the length (behind it) of the caudal peduncle, while the least height of the latter equals an eleventh ( $\cdot 9$ ) of the length.

The head forms more than a fifth ( $\cdot 21\frac{1}{2}$ ) of the extreme length, and is longer than high; the height at the upper angle of the preoperculum  $\cdot 19$ , and that at the pupil  $\cdot 17$  of the same length. The diameter of the eye is contained three and a half times ( $\cdot 6$ ) in the head's length, equals the snout and is twice as great as the height of the very oblique preorbital. The forehead and snout above are nearly rectilinear, and the former between the eyes is transversely arched and as wide as the diameter of the eye. The preoperculum is oblique behind and scarcely emarginated at its lower half, has its angle rounded and its inferior margin slightly ascending. The mouth is small and very oblique. The teeth are conic and curved, continued to the angles of the mouth and larger in front; behind is a transverse row of smaller ones.

The dorsal fin commences above the bases of the ventrals; its spinous portion is rather elevated, and its last spines rather shorter than the preceding; its base much exceeds a quarter ( $\cdot 28$ ) of the length; that of the soft nearly equals a seventh ( $\cdot 14$ ) of the length; at its middle the height nearly equals an eighth ( $\cdot 13$ ), and behind a tenth ( $\cdot 10$ ) of the length.

The anal, like that of *Furcaria puncta*, has its second spine as long as the succeeding rays, which are nearly uniform or even slightly increase towards the last.\*

The caudal forms more than a quarter ( $\cdot 27$ ) of the *extreme* length, the lobes, especially the upper, being prolonged and pointed, while the median rays only equal a tenth ( $\cdot 10$ ) of the length.

The pectorals are rather long ( $\cdot 18$ ) and bluntly angulated. The ventrals have the first ray filiform and equal to the pectorals; its base is behind that of the pectorals.

The scales have been mostly rubbed off in the single specimen in the museum. Those on the cheeks are triserial.

1  
D. XII. 11—. A. II. 12.

1 4  
Scales 32—33—. Lat. line sup. 21, (inf. 17!)

10  
The color is dark green. The dorsal blackish, except the hinder portion, (last four or five rays,) which is colorless. The caudal has its margins above and below black.

A single specimen was sent to the Institution by Mr. Xantus. It is in poor condition and slightly less than four inches long.

#### Genus GLYPHIDODON Lac.

##### GLYPHIDODON TROSCHELII Gill.

The form is similar to that of *Glyphidodon saxatilis* (Lac.) and its allies. The height equals half the length, exclusive of the caudal. The head forms a third of the same length and is as long as it is high close behind the eyes. The eye has a diameter nearly equal to a third of the head's length, is separated by a diameter from the muzzle, and the same distance from its fellow. The interorbital area is transversely convex. The preorbital bone is nearly parallel with the straight suborbitals. The preoperculum has a vertical posterior and horizontal inferior border, and its angle is obtuse or rounded.

The dorsal begins over the base of the lower rays of the pectorals. The pec-

\* *Furcaria cyanea* is represented by Poey with the anal acuminate at the middle like the dorsal.

torals and ventrals are nearly equal and almost as long as the head. The ventrals are inserted nearly as far back as the vertical of the third dorsal spine. The entire caudal equals the length of the head; the median rays equal about two-thirds of the longest.

D. XIII. 12. A. II. 13.

4 3  
Scales 25—, —. L. 1. 20.  
10 3

The color is light green or purplish; five rather narrow vertical bands cross the body; the *first* commences under or close before the front of the dorsal; the *second*, under the space between the third and fifth spine; the *third*, between the seventh and ninth; the *fourth*, under the thirteenth spine, and the *fifth* is close behind the dorsal and anal. The fins are immaculate, the external portions of the ventrals darker.

This species is apparently very common at Cape St. Lucas, Mr. Xantus having sent to the Smithsonian Institution about one hundred specimens, most of which are, however, very young; the largest are three or four inches long.

I dedicate the species to Dr. Troschel, who, by his annual reports on herpetology, ichthyology and malacology, as well as by the original memoirs published by him alone and in conjunction with the great J. Müller, has much contributed to the advancement of those departments of science.

#### On some new and little known American ANURA.

BY E. D. COPE.

##### *Hylodes dimidiatus*.

Form ranine. Head not broader than body, muzzle rather acute, depressed at the tip. Nostrils lateral. Eye of moderate size, twice the extent of the round tympanic membrane. Internal nares small, less than ostia pharyngea; vomerine teeth posterior to them, in two rather abruptly curved series; their inner extremities directed backwards, widely separated, their outer reaching the maxillary margin. Tongue oval, without posterior notch. Skin smooth above and below, except upon the posterior femoral region. A narrow dermal fold from the superciliary region nearly to the groin. Posterior lateral region rugulose. Digital pallettes well developed: no rudimentary membrane between posterior digits. Two metatarsal tubercles, that at the base of the least digit elongate; sole smooth. Palm tuberculous, two metacarpal warts, no tarsal dermal fold. Humerus three-fourths the length of tarsus, which is half as long as the tibia, which is longer than the femur. Length of head and body 1 in. 9 l. Antebrachium  $4\frac{1}{2}$  l. Tarsus and longest digit 1 in. 3 l. Hinder extremity, from groin, 2 in. 9 l.

Above brownish or pinkish gray, beneath yellowish. A black band passes from the end of the muzzle across the tympanic disc, beneath the lateral dermal fold, to about the middle of the side. A yellowish line on superior labial margin, indistinct anteriorly. A black, white-bordered spot on the crural region, sometimes one on each side of the end of the coccyx. Inner faces of extremities marbled; superior surfaces cross-banded. A very narrow white line extends from the end of the muzzle to the terminal coccygeal region. Some white spots on the posterior femoral surface.

*Habitat*.—Eastern Cuba. Mus. Smithsonian (No. 5099) Mr. Wright Coll. Mus. Acad. Philada.

This species exhibits much resemblance to Dr. Günther's *Cystignathus albilabris* in external form.

##### *Hylodes lentus*.

Form stout, depressed; posterior extremities short. Head not so wide as 1861.]